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A NEW IDOTEID ISOPOD, *IDOTEA (PENTIDOTEA) KIRCHANSKII*, FROM CENTRAL CALIFORNIA (CRUSTACEA)

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In his monograph on the idoteid isopods of northern California, Menzies (1950) reduces the genus *Pentidotea* Richardson, 1905, to the rank of a subgenus of *Idotea*[1] Fabricius, 1798, and gives an account of the six species then known. The present paper describes a seventh species in this subgenus. It is the third species of *Idotea* (*Pentidotea*) associated with surf grass (*Phyllospadix scouleri*), the other two being *I.* (*P.*) *montereyensis* (Maloney) Menzies, 1950 and *I.* (*P.*) *aculeata* (Stafford) Menzies, 1950. The new idoteid was first discovered during the course of ecological investigations on *Idotea montereyensis* (Lee, 1967) living alongside it on *Phyllospadix*, but unlike the latter isopod, *Idotea kirchanskii* did not appear to occur elsewhere intertidally.

Genus *Idotea* Fabricius, 1798

Menzies (1950) gives an emended diagnosis of the genus as follows: "GENERIC DIAGNOSIS: Flagellum of second antennae multiarticulate. Maxillipeds with a palp composed of four or five articles. Epimera of all the segments (somites) of thorax (peraeon), with the exception of the first, distinctly separated from the somites. Abdomen (pleon) composed of three segments, with a suture line on either side at the base of the terminal segment, indicating perhaps another partly coalesced segment. Includes the subgenera *Idothea* and *Pentidotea*."

[1] Many authors, including Richardson (1905) and Menzies (1950), spell the generic name "*Idothea*" but Fabricius' original spelling was "*Idotea*."

Subgenus *Pentidotea* (Richardson) Menzies, 1950

Maxillipedal palp with 5 articles rather than 4 as in the subgenus *Idotea.*

Idotea (Pentidotea) kirchanskii new species
Figures 1 and 2

Diagnosis: Body narrow, linear, compact. Color bright green with tips of appendages often red. Frontal process of head broadly triangulate with bluntly rounded apex, shorter than frontal lamina 1 of clypeus. Frontal lamina 1 prominent, broadly triangulate, wider and longer than frontal process and concealing frontal lamina 2 in dorsal view. Antenna 2 short, rarely extending past posterior margin of pereonite 2, with flagellum comprising 7–12 articles. Eyes round. Maxilliped with 1 coupling hook, rarely 2. Epimera distinctly separated on pereonites 2–7, but usually visible dorsally only on segments 5–7. Epimera of pereonite 7 triangular with acute posterior angles. Pleotelson with medial posterior margin convex, lacking apical tooth. Found on *Phyllospadix.*

Description: The following characters may be noted in addition to those given above.

Holotype male (21 mm × 3.2 mm), allotype ovigerous female (15 mm × 2.8 mm). Paratypes: 5 males, 1 nonovigerous female, 8 ovigerous females. In type series, length/width ratios in six males range between 5.2 and 7.1, in the nonovigerous female, the ratio is 5.6; in nine ovigerous females, the range is 4.3–5.7 due to expansion in width at pereonites 1–3.

Head (Fig. 1, *a–b*) with supra-antennal line slightly concave, but median third of it often becomes convex. Anterolateral cephalic margin slightly flared, rounded. Eyes round (lateral view). Lateral margins slightly indented anterior to eyes. Frontal lamina 2 of clypeus broad and almost semicircular in frontal view.

Antenna 1 (Fig. 1, *c*) composed of 4 short articles, extending only to about two-thirds the length of third peduncular article of antenna 2. First article of antenna 1 stout, about as wide as long, and twice as broad as those following; articles 2–4 subequal in length; article 4 somewhat clavate and provided with stout apical and subapical setae (sensory?). Antenna 2 (Fig. 1, *d*) rarely extends past posterior margin of second pereonite. Peduncle of antenna 2 composed of 5 articles, the first small and barely visible dorsally; articles 2 and 3 larger and subequal; articles 4 and 5 narrower and each slightly longer than third article. Flagellum of antenna 2 consists of 7–12 articles (but juveniles may have

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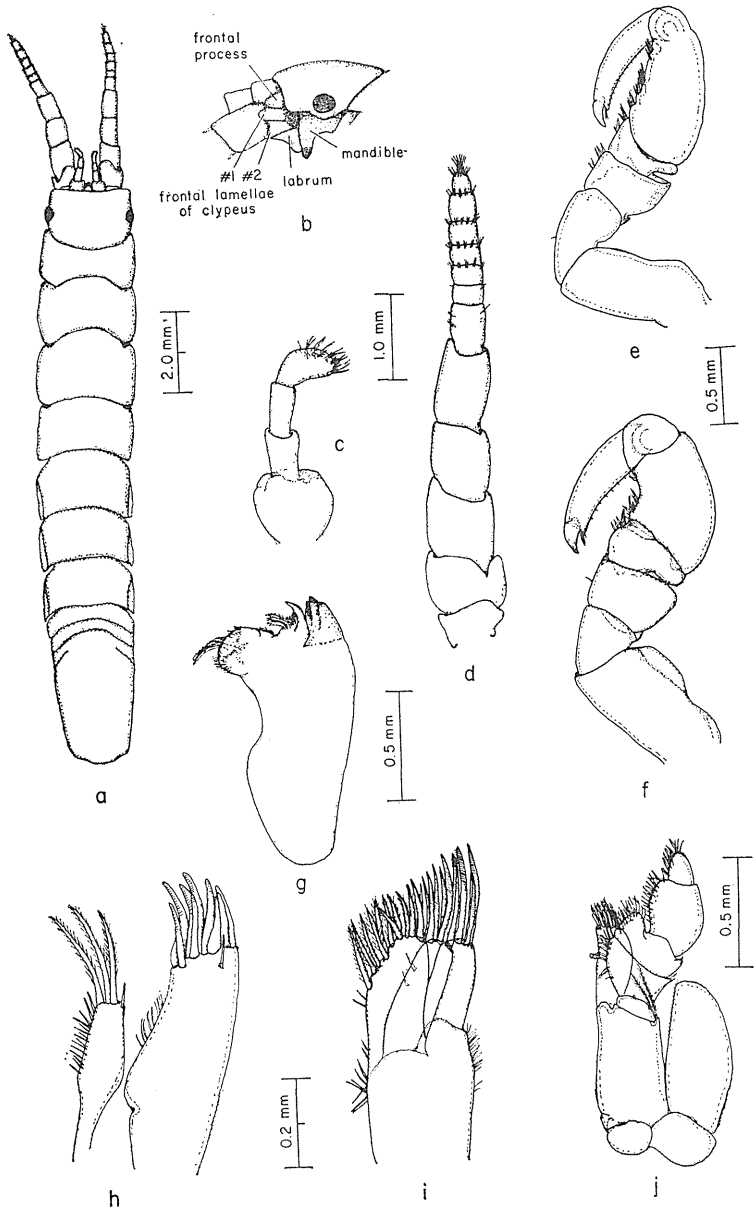
FIG. 1. *Idotea* (*Pentidotea*) *kirchanskii* new species. *a*, ♂ from Dillon Beach, dorsal view. *b*, head with left antennae and postmandibular mouthparts removed, side view. *c*, first antenna. *d*, second antenna. *e*, first pereopod. *f*, seventh pereopod. *g*, left mandible. *h*, first maxilla. *i*, second maxilla. *j*, maxilliped.


frontal process
mandible
#1 #2
labrum
frontal lamellae of clypeus
b
2.0 mm
a
1.0 mm
c
d
e
0.5 mm
f
0.5 mm
g
0.2 mm
h
i
0.5 mm
j

as few as 3 joints)—the first longest and often showing partial articulation; the last minute and semicircular in outline.

Mouthparts normal for genus (Fig. 1, *g–j*). Mandibles with heavily sclerotized incisive process and truncate molar process bearing a brush of setae. First maxilla has inner lamina with 3 long plumose setae and one short seta at apex, and outer lamina with stout apical spines, the inner slightly ctenate. Second maxilla trilobate, inner lobe fringed with long plumose setae, outer lobes with ctenate setae. Maxilliped has palp of 5 articles, and endite with 1 coupling hook (rarely 2).

Lateral thoracic margins subparallel, not sharply incised between segments. Posterior margin of first pereonite decidedly concave, that of second less so, that of third more or less straight, those of following segments medially convex.

Epimera of pereonites 2–4 do not extend the length of their segments, whereas those of segments 5–7 do. Epimera of pereonites 2 and 3 never visible from above, those of pereonite 4 sometimes visible dorsally, those on remaining three pereonites at least partially visible dorsally. Posterolateral edges of fifth and sixth segments somewhat rounded, edges of seventh form an acute angle. Sternal parts of coxal rings not fused medially leaving prominent medial groove. Coxal sockets deep.

Pereopod 1 (Fig. 1, *e*) bears row of stout conical setae along entire palmar margin of propodus; each seta complex with many fine filelike ridges facing palm and a filiform extension of its axis beyond bifid apex. Also one large complex seta and several smaller simple setae on distal edge of carpus. Dactylus with long curved unguis and accessory claw at base. Pereopod 7 (Fig. 1, *f*) with keel on external margin of basis, and a few stout, coarsely pectinate, spiniform setae at base of palmar margin of propodus and a few at distal margin of carpus.

Posterior margin of telson slightly convex, evenly rounded, lacking posterolateral angles, sometimes slightly produced in broad median lobe, but without apical tooth.

Penes (Fig. 2, *a*) double, short, flattened, bluntly tapered processes attached to sternite of seventh pereonite. Pleopod 1 (Fig. 2, *b*) with quadrate base bearing 8 stout coupling spines on medial distal border and two laminar rami each fringed with long plumose setae. Pleopod 2 of male (Fig. 2, *c*) bears long, slender appendix masculina extending along entire length of medial edge of endopod and beyond its distal edge, with rounded apex armed subapically with rows of spiny scales; both rami fringed with plumose setae. Posterior 3 pairs of pleopods also biramous, but show progressive reduction in marginal setation. Pleopod 3 (Fig. 2, *e*) has setae only on exopod and these are sparse compared to those of first and second pleopod, with plumose types limited to distal and distolateral margins. Pleopods 4 and 5 (Fig. 2, *f–g*) similar, with rami seemingly bare, but under magnification exopods show a sparse fringe of short, spinelike setae. Branches of pleopods 1 and 2 uniarticulate, but exopods of last 3 pairs show lateral and medial partial sutures connected by fine transverse lines making them biarticulate.

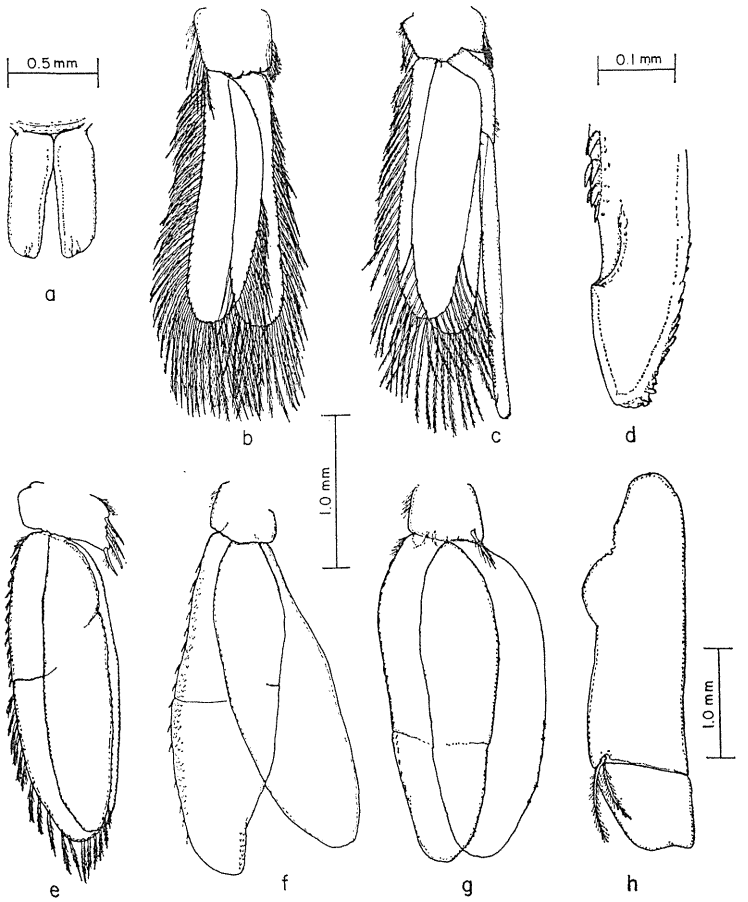


FIG. 2. *Idotea* (*Pentidotea*) *kirchanskii* new species, ♂ pleonal appendages. *a*, penes. *b*, first pleopod. *c*, second pleopod. *d*, tip of appendix masculina. *e*, third pleopod. *f*, fourth pleopod. *g*, fifth pleopod (exopod somewhat flattened). *h*, uropod.

Uropod (Fig. 2, *h*) uniramous with 3 plumose setae at outer distal angle of basal joint.

Localities: CALIFORNIA: Monterey County, Pebble Beach, 17 Mile Drive at Seal Rock, intertidal on *Phyllospadix* (6 ♂♂, 10 ♀♀ [9 ovigerous]), 14 May 1968, W. L. Lee (type-locality); Marin County, Dillon Beach, Second Sled Road, intertidal on *Phyllospadix* (10 ♂♂, 7 ♀♀ [2 ovigerous]), 18 June 1962, W. L. Lee. Additionally, this isopod has

TABLE 1. Similarities between *Idotea kirchanskii* and *I. aculeata.*

1. Body linear, sides subparallel.
2. Frontal process widely angulate and shorter than frontal lamina 1, with blunt, evenly rounded apex. In ovigerous females of *I. aculeata*, Menzies (op. cit.) notes that the apex is often somewhat concave, a variation not found in *I. kirchanskii.*
3. Frontal lamina 1 prominent, broadly triangulate, wider than frontal process and extending forward beyond it in dorsal view.
4. Eyes round.
5. Single coupling hook on maxilliped.
6. First pleonite with wide lateral borders.
7. Posterolateral margin of epimeron of seventh pereonite acute.
8. Posterolateral angles of pleotelson rounded.

been collected intertidally on many occasions at Dillon Beach, Marin Co.; and in Monterey Co., at Pacific Grove and Pebble Beach and in various localities between Carmel and Rocky Point. It has only been found on *Phyllospadix scouleri* and invariably it is the same green color as that plant.

Disposition of material: Types are deposited in the Smithsonian Institution. Holotype—USNM 125205, allotype—USNM 125206, paratypes —USNM 125207. Other material has been placed in the collections of the authors and the California Academy of Sciences, Golden Gate Park, San Francisco.

Etymology: The species is named in honor of Mr. James Kirchanski in recognition of his contribution to education in central California.

Distribution: The known geographical range of *Idotea kirchanskii* extends south from Dillon Beach, Marin County to Rocky Point, Monterey County, California. Its distribution within this range is imperfectly known, but it appears to be more abundant in the southern portion. Relatively few specimens were found at Dillon Beach where *I. montereyensis* is the dominant species on surf grass. At Rocky Point, however, *I. kirchanskii* is abundant and almost completely replaces *I. montereyensis.*

The range of *Idotea kirchanskii* overlaps the northern end of the distribution of its closest relative, *Idotea aculeata*, which is found from Dillon Beach, Marin County, south to La Jolla, San Diego County, California (Menzies, 1950). George and Strömberg (1968), however, report *I. aculeata* from San Juan Archipelago, Washington, a locality far north of its previously known range. *I. aculeata*, according to Menzies, is a major component of the isopod fauna south of Point Conception—a major breakpoint at about 34½° N latitude which separates the temperate marine biota of northern California from the transitional warm temperate biota of southern California. It is possible that some reports of *I. aculeata* north of Point Conception may be *I. kirchanskii* as the two species are quite similar (see Table 1).

TABLE 2. Differences between *Idotea kirchanskii* and *I. aculeata.*

	I. kirchanskii	*I. aculeata*
1. Body	Compact, pereonites without lateral incisions between them.	Not compact, lateral thoracic margins incised, especially between pereonites 1–4.
2. Color	Always green.	Mostly pink or red.
3. Head	Eyes bulge at lateral margins. Frontal process not concave.	Lateral margins not bulged. Frontal process in ovigerous females often concave.
4. Antennae 2	Short, barely reaching posterior margin of pereonite 2.	Longer, reaching almost to posterior margin of pereonite 4.
5. Pereonite 3	Posterior margin more or less straight.	Posterior margin concave.
6. Epimera	Dorsally visible only on pereonites 5–7.	Dorsally visible on pereonites 2–7.
7. Pleonites	Lateral margins curved inward anteriorly.	Lateral margins entirely straight.
8. Telson	Posterior margin without apical tooth.	Posterior margin with bluntly pointed median tooth.

Relationships: The fact that *Idotea kirchanskii* keys to *I. aculeata* in Menzies' (1950) monograph indicates a close morphological relationship between these two species. They differ significantly, however, in other respects. The similarities between the two species are shown in Table 1, the differences in Table 2.

A few specimens which have characters intermediate between *Idotea kirchanskii* and *I. montereyensis* have been found. *I. montereyensis* is also found on the same plant as the new species which suggests the possibility of some hybridization between them.

The separation of *I. aculeata* from other pentidoteans in Menzies' (1950) key is based on characteristics common to both *I. aculeata* and *I. kirchanskii*; however, with few modifications the key can be altered to conveniently include *I. kirchanskii.* The emended key is presented below:

KEY TO THE NORTHERN CALIFORNIA SPECIES OF THE SUBGENUS *PENTIDOTEA*

1. Apex of frontal process entire. Maxilliped with one coupling hook. Eyes not markedly transversely elongate, length along body axis one-half or greater than one-half the width 2
— Apex of frontal process with a median notch 6
2. Frontal process blunt or widely angulate, not extending beyond frontal lamina 1. Frontal lamina 1 triangulate in dorsal view .. 3
— A narow, pointed frontal process exceeds considerably the forward extent of a semicircular frontal lamina 1 5
3. Posterolateral margin of epimeral plate of seventh peraeon somite evenly convex, not acute. Eyes somewhat pyriform ..... *I.* (*P.*) *schmitti* Menzies
— Posterolateral margin of epimeral plate of seventh peraeon somite acute. Eyes reniform or oval 4
4. First pleon somite with acute lateral borders. Eyes reniform ..... *I.* (*P.*) *wosnesenskii* (Brandt) Menzies
— First pleon somite with wide lateral borders. Eyes circular 7
5. Telson posterior margin deeply concave, posterolateral angles acute, each angle with a small but noticeable dorsal carina. Specimens usually found on eel grass (*Zostera* sp.) ..... *I.* (*P.*) *resecata* (Stimpson)
— Telson posterior margin usually convex, with a small but distinct median tooth; when concave then only slightly so and lacking acute posterolateral angles and lacking any dorsal carina above each angle. Specimens usually found on surf grass (*Phyllospadix* sp.) ..... *I.* (*P.*) *montereyensis* (Maloney)
6. Maxilliped with two coupling hooks. Eyes transversely elongate ..... *I.* (*P.*) *stenops* (Benedict)
— Maxilliped with one coupling hook. Eyes oval ..... Some adult specimens of *I.* (*P.*) *aculeata* (Stafford)
7. Segments distinctly separated laterally, lateral margins of cephalon entire, second antennae reaching almost to posterior margin of fourth thoracic segment, epimera noticeably visible dorsally on segments two through seven ..... *I.* (*P.*) *aculeata* (Stafford)
— Segments not sharply separated laterally, lateral margin of cephalon indented anterior to the eyes, second antennae short, reaching almost to posterior margin of second thoracic segment, epimera noticeably visible dorsally only on segments five, six and seven ..... *I.* (*P.*) *kirchanskii* Miller and Lee

Ecology: Little is known of the ecology of this species. It appears, however, to be restricted to one particular habitat, the green intertidal flowering plant, *Phyllospadix scouleri.* It is remarkably adapted for clinging to the wave-swept blades of this surf grass and accordingly is found on it even in rough water. Analysis of gut contents suggests that

the animal feeds on both *Phyllospadix* and a wide variety of epiphytes found on the long narrow blades of the plant.

Initial investigations suggest that *Idotea kirchanskii* does not seem to change color in response to a change in the color of its substrate as does *I. montereyensis* (Lee, 1966a, 1966c), although superficial examination has revealed a pigmentary system similar to that found in the latter species (Lee, 1966a, 1966b).

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